

innovation to meet the CLIMATE CHALLENGE

UNITED NATIONS CLIMATE CHANGE CONFERENCE COP22

Marrakesh

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THE FUTURE OF MATERIALS AND ENERGY

Carbon Fiber Production



CLEAN CARBON
TECHNOLOGY

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CleanCarbonTechnology

proprietary information

End – Scenario: using natural CO₂

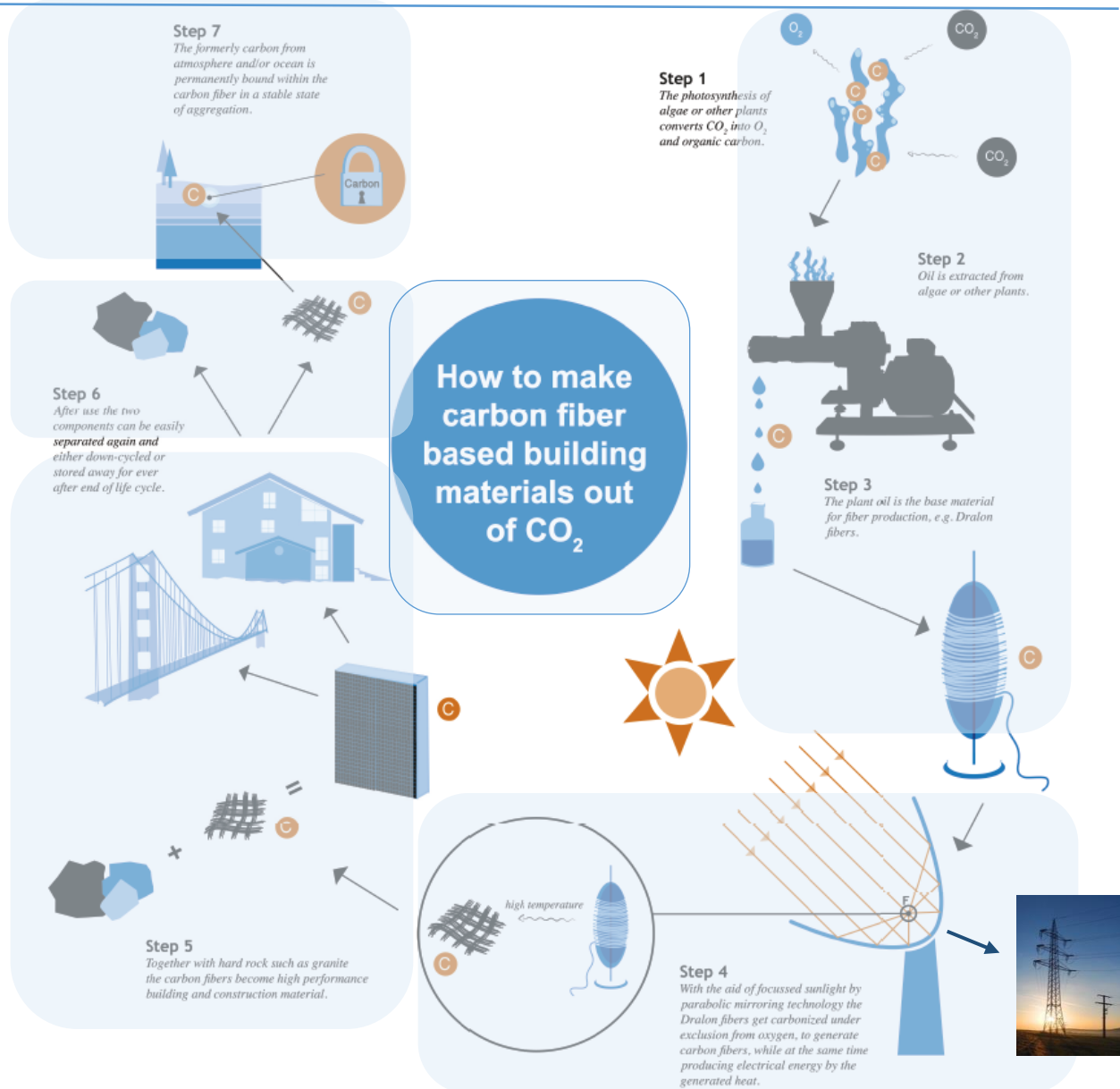
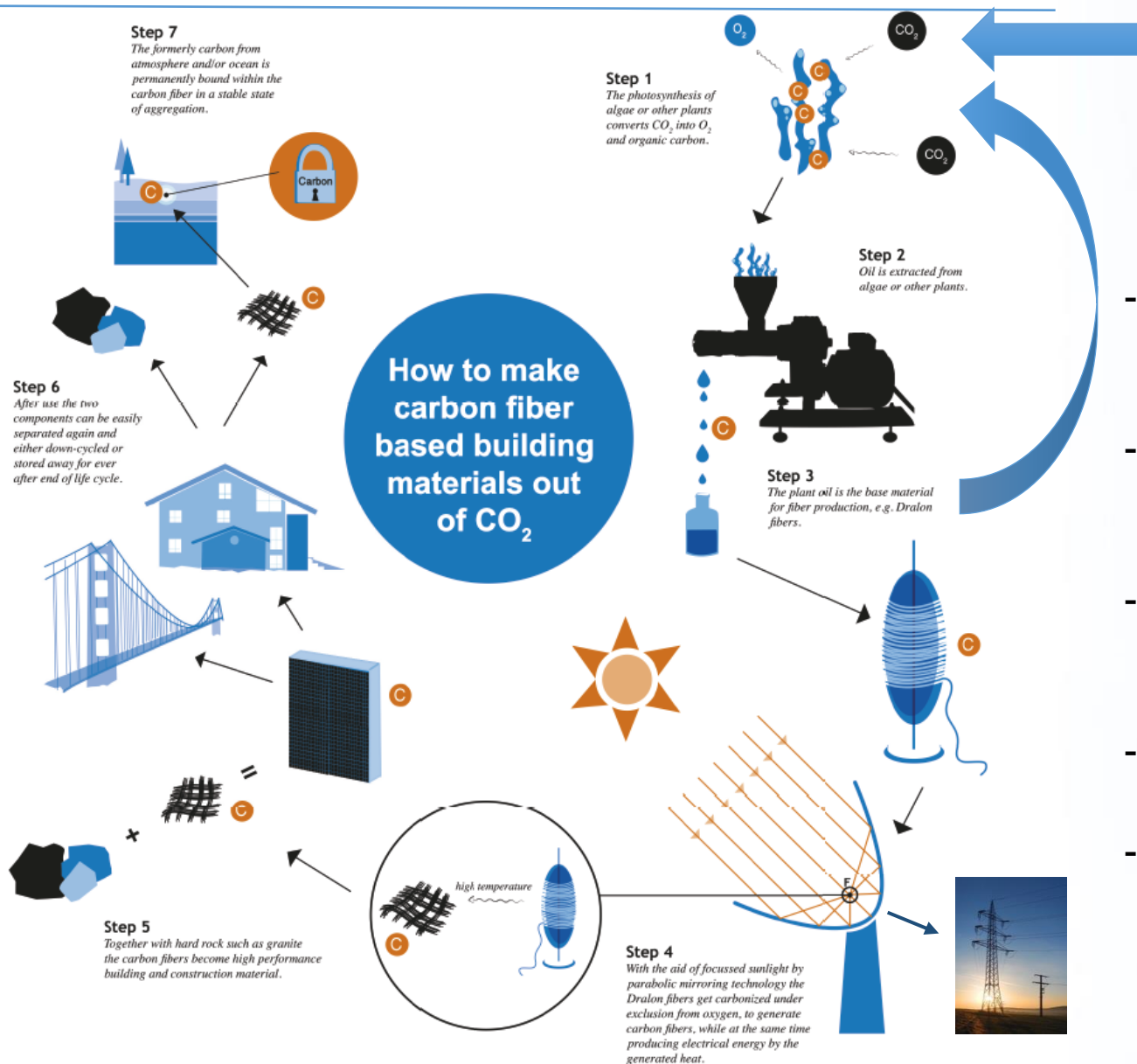


Illustration: Vivian Roth - vivianroth@gmx.net

Carbon negativity is being reached by:

- making of the fiber precursor from algal oil
- using focused sunlight for simultaneous fiber + electricity production
- replacement of steel, aluminum and concrete by carbon fibers + minerals
- separation of carbon and minerals after use
- storage of solid state carbon underground
- leading over time to **carbon negativity** in case we make the material out of natural CO₂ → withdrawel of 4 Gt CO₂/a

Start – Scenario: using sequestered CO₂



Sequestered CO₂ from process gas or PP-gas

Carbon neutrality, algae in tanks :

- land use 0.5 mio sq miles in deserts close to salt water
- to produce 1,1 Gt/a of carbon fibers to replace first steel and later cement over time
- and biodiesel as side product to drive all industrial transportation for example
- such scenario is leading to **carbon neutrality**
- financial analysis indicates feasibility with 100\$ carbon credits per ton of CO₂

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Carbon fibers are already used in applications like



Automotive



Aviation



Construction

If we are to make it for a below 2°C target, we need to:

- **1. Reduce greenhouse gas CO₂ release by implementing renewables**
 - **2. Establish CO₂ neutrality** by CO₂ absorption of process gases (cement + steel) and Power Plants
 - **3. Transformation of CO₂** into climate relevant amounts of carbon fibers to reach **CO₂ negativity**
 - **4. Enabling** a long term **safe** Carbon-storage strategy (for millions of years)
- needed investment **\$ 600 Million** per plant like “Moses Lake/BMW” with 9kt/a of carbon fibers
- until 2100 → 1,1 Gt/a → 100.000 x Moses Lake → **\$ 700 Billion/a → 1 % of GDP**

Financial analysis predicts at least 5% annual return of investment for the transformation into a carbon based economy.



- final withdrawal of CO₂ → 4 Gt/a
- in 2500 → 1600 GtCO₂

Thank You